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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/899,627	07/05/2001	Jong-won Lee	8021-55 (SS-14743-US)	5141

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EXAMINER

GUERRERO, MARIA F

ART UNIT	PAPER NUMBER
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2822

DATE MAILED: 03/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/899,627

Applicant(s)

LEE ET AL.

Examiner

Maria Guerrero

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 December 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 12-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 12-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is in response to the Amendment filed December 3, 2003.

Claims 1-11 and 27 are canceled.

Claims 12-26 are pending.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 12-18 are rejected under 35 U.S.C. 102(e) as being anticipated by Aoki et al. (U.S. 6,524,376).
3. Aoki et al. teaches forming a barrier layer (adhesive layer) along a stepped portion over the surface of an interdielectric layer having a recessed region (trench region and contact holes) (Fig. 1A, 8A, 10C, col. 14, lines 35-44). Aoki et al. discloses forming a copper seed layer by sputtering (physical vapor deposition) on the barrier layer (col. 14, lines 40-47).
4. In addition, Aoki et al. shows exposing the barrier layer by chemical mechanical polishing using a solution comprising an oxidizing agent (hydrogen peroxide), a pH controlling agent, a chelate reagent, and water (col. 8, lines 20-50, col. 9, lines 1-11, col. 10, lines 10-15, col. 14, lines 50-65). Aoki et al. teaches the copper seed layer remaining

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only within the recessed region (Fig. 8B). Aoki et al. teaches preparing a solution without abrasives and adding the abrasives to form the slurry; therefore, the solution does not contain abrasives (col. 8, lines 20-43).

5. Furthermore, Aoki et al. shows forming a copper layer on the copper seed layer, the copper layer, the copper seed layer, and the barrier layer projecting in order above the surface of the interdielectric layer (Fig. 8A). Aoki et al. teaches planarizing the copper layer, the copper seed layer, and the barrier to form a copper interconnection layer (Fig. 8B, col. 13, lines 1-10).

In addition, the elements must be arranged as required by the claim, but this is not an ipsissimis verbis test, i.e., identity of terminology is not required. In re Bond, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 12, 16, and 18-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaufman et al. (U.S. 6,063,306) in view of Chan et al. (U.S. 6,495,200).

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7. Kaufman et al. teaches forming a barrier layer (adhesive layer) along a stepped portion over the surface of an interdielectric layer having a recessed region (trench region and contact holes) (col. 1, lines 5-20, 25-65). Kaufman et al. shows exposing the barrier layer by chemical mechanical polishing using a solution comprising an oxidizing agent, a pH controlling agent, a chelate reagent, and water (col. 3, lines 40-48, 60-67, col. 4, lines 1-5, 57-65, col. 5, lines 5-65, col. 6, lines 3-55, col. 7, lines 13-20).

8. Furthermore, Kaufman et al. discloses oxidizing agent being hydrogen peroxide or an oxidizing agent of an ammonium series (col. 5, lines 5-30). Kaufman et al. shows the oxidizing agent from the ferric series as conventional use in the art (col. 2, lines 35-40). Kaufman et al. teaches the oxidizing agent being in a range of 0.01% to 3.0% by weight or 0.3% to about 17% by weight, the chelate reagent (benzotriazole (BTA)) being in a range of 0.01 to about 1% by weight (col. 3, lines 40-48, col. 5, lines 30-37, col. 6, lines 24-40). Kaufman et al. teaches controlling the pH using an acid (nitric acid) or a basic solution (ammonium hydroxide) and the pH being from about 2.0 to about 12.0 (col. 7, lines 12-22). Kaufman et al. discloses as conventional in the art the slurry comprising an abrasive and a chemically reactive solution (col. 2). Kaufman et al. teaches the solution having non-abrasive components (col. 10, lines 65-67, col. 11, lines 1-5).

9. Kaufman et al. does not specifically show forming a copper seed layer on the barrier layer. However, Kaufman et al. discloses forming a copper film on the barrier layer (col. 3, lines 60-67). Chan et al. shows the formation of the seed layer before forming a copper film as well known in the art (Fig. 1A-1D, col. 2, lines 10-32).

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10. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to apply Kaufman et al. method to the copper film including the conventional seed layer as taught Chan et al. The modification would provide a process that would selectively polish the copper and barrier layer while avoiding the dishing and erosion problems (Kaufman et al., col. 3, lines 9-30).

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

11. Claims 12, 14-15, and 17 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-6 of U.S. Patent No. 6,610,596 in view of Aoki et al. (U.S. 6,524,376). Claims 1-6 of U.S. Patent No. 6,610,596 recites all the limitations of claims 12, 14-15, and 17, except for the copper seed layer and the solution comprising an oxidizing agent, a pH controlling agent, a chelate reagent, and water. However, Aoki et al. teaches the copper seed layer

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and the solution comprising an oxidizing agent, a pH controlling agent, a chelate reagent, and water (col. 8, lines 20-50, col. 9, lines 1-11, col. 10, lines 10-15, col. 14, lines 50-65).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to include the recitation of the copper seed layer and the solution comprising an oxidizing agent, a pH controlling agent, a chelate reagent, and water as suggested Aoki et al. because is conventional employed in the art.

Response to Arguments

12. Applicant's arguments with respect to claims 12-26 have been considered but are moot in view of the new ground(s) of rejection.

Furthermore, during examination, the claims must be interpreted as broadly as their terms reasonably allow. This means that the words of the claim must be given their plain meaning unless applicant has provided a clear definition in the specification. In re Zletz, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989); MSM Investments Co. v. Carolwood Corp., 259 F.3d 1335, 1339-40, 59 USPQ2d 1856, 1859-60 (Fed. Cir. 2001).

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Mravic et al. (U.S. 6,083,840) is cited as evidence to show that

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the solutions disclosed by Aoki et al. and Kaufman et al. do not contain abrasives (col. 5, lines 15-25, 50-55, col. 6). Chopra et al. (U.S. 6,313,038) is considered pertinent to applicant's disclosure.

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria Guerrero whose telephone number is 571-272-1837.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 571-272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Maria Guerrero
Primary Examiner
March 10, 2004